EXHIBIT D

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF WEST VIRGINIA
AT CHARLESTON

IN RE: ETHICON, INC., PELVIC REPAIR SYSTEM PRODUCTS LIABILITY LITIGATION **THIS DOCUMENT RELATES TO WAVE 1 / TVT-O CASES**	**Master File No. 2:12-MD-02327** **JOSEPH R. GOODWIN** **U.S. DISTRICT JUDGE**

RULE 26 EXPERT REPORT OF JERRY G. BLAIVAS, M.D.

The following report is provided pursuant to Rule 26 of the Federal Rules of Civil Procedure. My opinions are as follows:

I. QUALIFICATIONS

Dr. Blaivas is a board certified urologist in the state of New York. He attended Tufts College for his bachelor's degree in 1964 and Tufts University School of Medicine for his medical doctorate in 1968. He completed a urology residency in 1976 after completing a general surgery internship followed by a two year general surgery residency. He has been teaching medicine since 1976 at Tufts University School of Medicine, Columbia University, Cornell University and most recently, SUNY Downstate Medical School. Throughout his academic career, Dr. Blaivas remained a practicing surgeon in a number of hospitals in Massachusetts and New York, and is currently an attending surgeon at The New York Presbyterian Hospital and Lenox Hill Hospital.

Dr. Blaivas is one of the pioneers of sling surgery for women with sphincteric incontinence. He performed his first autologous rectus fascial sling operation in 1981 and shortly thereafter modified the technique by creating a fascial graft instead of a fascial flap which was the prevailing method at the time. The reason for this change is that the flap was tethered by its abdominal attachments such that it was very difficult to place the sling loosely enough to avoid causing urethral obstruction. Once that modification was adapted, it was much easier to place the sling without any tension at all and that principle became the guiding principle for the subsequent development of synthetic mesh slings. In 1998, Dr. Blaivas, in a peer review journal, proposed that rectus fascial sling be considered a suitable operation for all women with sphincteric incontinence. Prior to that time, it was

considered to be indicated only in women with complicated problems who had failed prior incontinence operations.

In the 1980's, Dr. Blaivas became acquainted with severe complications that resulted from synthetic mesh slings composed of Marlex and Mersilene. He performed a number of surgeries to remove these slings because of severe, refractory complications including pain, infection, erosion and urinary fistula. So difficult and problematic were these complications that Dr. Blaivas traveled to Toronto and spent some time with Ted Morgan, MD – a gynecologist who performed the largest number of these operations in the peer review literature. Dr. Morgan was considered to be a highly qualified surgeon, but even in his hands devastating complications occurred and they often occurred years after the original surgery. In the hands of less skilled surgeons, the complication rate was much higher. Dr. Blaivas discussed the surgical technique of sling surgery and methods of treating complications in great detail with Dr. Morgan. He concluded that: 1) even in the hands of a master surgeon, devastating complications could occur with synthetic slings, but rarely if ever occurred with autologous fascial (graft) slings; 2) in the hands of inexperienced surgeons, the complication rate could be unacceptably high; 3) removal of the mesh was exceedingly difficult and fraught with its own complications; 4) once a complication occurred, the chances of a successful outcome are low; and 5) the mesh itself, because it is a foreign body, contributes significantly to the complication rate. Because of these known complications and the technical difficulties performing mesh surgery, the operation fell out of favor until synthetic slings were revived, reinvented and promoted by industry through pervasive advertising and inducements to physicians to perform such surgeries.

Dr. Blaivas himself was heavily "recruited" by manufacturers of synthetic slings to become a "key opinion leader" and promote sling surgery. He was thoroughly vetted by industry representatives and Peter Petros, MD, one of the pioneers of synthetic sling surgery, spent a week with him in New York at his office and in the operating room discussing and demonstrating the theory and surgical technique of synthetic sling surgery. It was during this period of time that Dr. Blaivas decided to perform some synthetic slings in highly selected patients because the procedure could be performed so quickly and with so small an incision. Once he became adept at the technique through simulated training, he realized that there really wasn't any need for the "sling kit" that was supplied by the manufacturer. Further, he thought that the technique of passing the trocars from the vagina upwards to the abdomen was a much more dangerous technique that could lead to adjacent organ injury. So, instead, he fashioned a strip of "Gynemesh" and used a Stamey needle to pass the trocars from the abdomen to the vagina. He further modified the technique to include dissection alongside the urethra into the retropubic space, nearly eliminating the possibility of injuring the bladder or urethra or adjacent organs with the trocars.

In essence, Dr. Blaivas was using exactly the same technique he used for rectus fascial slings (which was considered the gold standard for incontinence surgery) and simply replaced the rectus fascial graft with a synthetic graft. Dr. Blaivas considered that synthetic slings, using the technique described here, could actually improve sling surgery provided that the new meshes were improved to the point that they had an acceptable safety

profile and, in fact, he opined that synthetic slings will become the standard once the bugs were worked out. But to date, that has not happened. Throughout this time (the last decade of the 20th and first decade of the 21st century), Dr. Blaivas became increasingly aware of devastating, life threatening, and life style altering complications of synthetic sling surgery and became a world renowned expert at treating those complications. He has personally operated on about 75 – 100 patients with severe synthetic mesh complications, and taken care of hundreds more who either did not elect further surgery or who simply gave up and were seeking relief from pain management experts. He has also discussed these issues with his peers. It is that experience, supported by peer-reviewed scientific literature, which forms the basis of the following opinions.

In August, 2015, Dr. Blaivas published the review article, "Safety considerations for synthetic sling surgery" in Nature Reviews Urology. The Nature family of journals is regarded as one, if not *the* premier resource for scientific research in the world.[1] Publication in Nature Reviews Urology, requires that the article meet strict criteria.[2] In its final version, the article was a herculean project - naming nine authors, spanning 29 pages, and containing 397 references. The exhaustive research presented in this paper further supports the opinions.

All of these opinions are to a reasonable degree of medical certainty. He applied the same scientific rigor that he uses in all aspects of his professional activities, including caring for patients, publishing, lecturing, consulting with other health care professionals, and serving as a litigation expert. The methodology he used in rendering my opinions is the same that he uses in his professional activities. His opinions have been consistent over time and do not differ just because they are provided for various purposes or audiences.

Dr. Blaivas' Curriculum Vitae is attached hereto and by reference made a part hereof. Please see Exhibit "A" attached.

II. DISCUSSION OF OPINIONS

1. The Gynecare TVT-O is a polypropylene mesh product made and marketed by Ethicon to allegedly treat stress urinary incontinence ("SUI"). The product consists of:

- PROLENE® polypropylene mesh (either Mechanically Cut Mesh ("MCM") or Laser Cut Mesh ("LCM")) with a polyethylene sheath or covering and attached trocars / surgical devices
- A TVT introducer
- A TVT Rigid Catheter Guide

[1] "The Nature Reviews clinical journals commission leaders in the field to write clinical content of the highest quality, authority and accessibility. Content is subject to rigorous review by our in-house editors and/or peer-review, and counsel is provided by the Editors-in-Chief and an international Advisory Boards to ensure comprehensive coverage of topical issues." Nature.com accessed 12/18/2015.

2 The criteria for publication include: Timely, accurate and balanced; Important for practicing doctors, researchers and academics in the subspecialty; Interesting and accessible to practicing doctors, researchers and academics in wider specialties. Nature.com accessed 12/18/2015.

- Instructions for use (IFU)

2. From the time it was introduced to the market through January 2015, the IFU for the TVT-O did not change. In January 2015, Ethicon introduced a new IFU[3] with some modifications, as discussed below.

3. The Gynecare TVT-O should not have been designed for placement in a surgically contaminated field[4] without proper animal and clinical studies to document safety and without a clear warning about the possibility of short and long term complications.[5] Bacteria attaches to mesh during the insertion process and can cause both acute and chronic infections in women.[6] Infection, even subclinical, can result in chronic inflammation, scarring, pain, abscess, vaginal, bladder and urethral erosion and other complications.

4. The Gynecare TVT-O causes serious and life-style altering complications including but not limited to chronic pelvic pain syndromes, chronic dyspareunia and sexual impairment, nerve injuries, de novo urinary symptoms, infections, fistulas, urethral obstruction, urethral strictures, bladder stones, death, vaginal, urethral, and bladder erosions, pelvic organ dysfunction, pelvic anatomy distortion, and other complications. These complications often require reoperation and are sometimes permanent. Because of these complications, the risks of these devices outweigh the benefits. I also am aware of many complications including deaths, injury to the iliac artery and vein, bowel injury and ureteral injuries despite the fact that virtually none of these complications were reported in the peer review literature.[7] Many of these complications can occur many years or even decades after the original surgery.[8]

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[3] 1/2015 TVT Obturator IFU from Ethicon website

[4] E.g., Culligan P, Heit, M., Blackwell, L., Murphy, M., Graham, C. A., & Snyder, J. Bacterial colony counts during vaginal surgery. Infectious Dieseases in Obstetrics and Gynecology. 2003;11(3):161-5.

[5] E.g., Vollebregt A, Troelstra, A., & van der Vaart, C. H. Bacterial colonisation of collagen-coated polypropylene vaginal mesh: are additional intraoperative sterility procedures useful? International Urogynecology Journal and Pelvic Floor Dysfunction.2009: 20(11):1345-51; Choi JJ, Palaniappa, N. C., Dallas, K. B., Rudich, T. B., Colon, M. J., & Divino, C. M. Use of Mesh During Ventral Hernia Repair in Clean-Contaminated and Contaminated Cases. Annals of Surgery. 2012;255(1):176-80.

[6] E.g., Vollebregt, 2009; Choi, 2012; Klinge U, Klosterhalfen, B., Muller, M., Ottinger, A. P., & Schumpelick, V. Shrinking of polypropylene mesh in vivo: an experimental study in dogs. The European Journal of Surgery. 1998;164(12):965-9.

[7] E.g.,Petri, 2012; Rogo-Gupta, 2013; Ross S, Robert M, Swaby C, Dederer L, Lier D, Tang S, et al. Transobturator tape compared with tension-free vaginal tape for stress incontinence: a randomized controlled trial. Obstetrics and gynecology. 2009;114(6):1287-94; Cholhan HJ, Hutchings TB, Rooney KE. Dyspareunia associated with paraurethral banding in the transobturator sling. American journal of obstetrics and gynecology.

[8] Boyles SH, Edwards R, Gregory W, Clark A. Complications associated with transobturator sling procedures. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18(1):19-22; Parnell BA, Johnson EA, Zolnoun DA. Genitofemoral and perineal neuralgia after transobturator midurethral sling. Obstetrics and gynecology. 2012;119(2 Pt 2):428-31.

5. The transobturator approach, such as that used with the Gynecare TVT-O, increases the risk of nerve injury, leg pain, chronic pain, dyspareunia, and vaginal scarring/banding. Review of Ethicon documents indicate a discussion of possible modifications of the TVT-O due to reports of postoperative pain, presumed secondary to the tape in the adductor muscles or positioning during implantation (August 2003, March 2004) and contemplated inclusion of nerve injury in Ethicon's statement of complications (November, 2004).[9] However, neither of these proposals was adopted.[10]

6. The two most debilitating and challenging complication to treat are chronic pain and urinary fistulas. This pain can be located in the abdomen, pelvis, vagina, buttocks, perineum, groin, thigh, or leg. It can be acute (occurring immediately after surgery) or chronic with an insidious onset. It is often refractory to traditional treatments. It can be related to erosion; scarring; mesh deformation; entrapment or compression of large nerves with classic or atypical nerve distribution; entrapment of smaller nerve branches with diffuse distribution; muscular inflammation, scarring, trauma, and hypertonicity; visceral pain syndromes; and other complications. It can be associated with other sensory changes such as numbness and tingling.

7. Chronic Mesh Pain Syndrome (CMPS) has been described in the medical literature. The syndrome is characterized by the transformation of vaginal pain into a multi-organ system process. The pain is considerably greater and lasts longer than routine post-operative pain and treatment is extremely challenging.[11] The pain may continue, or even worsen, after mesh excision or revision. Completely new treatment modalities for pelvic pain have been developed as a response to this pain management challenge, including trigger point injections, nerve blocks, Botox injection, pelvic floor physical therapy, treatment with medications for chronic, neuropathic pain, and referral to contract-based pain management programs. These were extremely rarely used in urology or gynecology until the appearance of mesh-related pain.[12]

8. These and other complications may occur even in experienced hands and when proper surgical technique is used. Ethicon's marketing materials suggest that these complications occur mostly because of faulty surgical technique performed by inexperienced or poorly trained surgeons, perhaps by "over-tensioning" or misplacement. However, I have firsthand knowledge that is not the case. For example, I operated on one woman who had urethral erosion of synthetic mesh three years after it was implanted by

[9] ETH.MESH.03803462; ETH.MESH.03364532
[10] ETH.MESH.02180759; ETH.MESH.03803462; ETH.MESH.00632022; ETH.MESH.03928235
[11] E.g., Rogo-Gupta, 2013.
[12] E.g.,Petri, 2012; Rogo-Gupta, 2013; Ross S, Robert M, Swaby C, Dederer L, Lier D, Tang S, et al. Transobturator tape compared with tension-free vaginal tape for stress incontinence: a randomized controlled trial. Obstetrics and gynecology. 2009;114(6):1287-94; Cholhan HJ, Hutchings TB, Rooney KE. Dyspareunia associated with paraurethral banding in the transobturator sling. American journal of obstetrics and gynecology;202(5):481 e1-5; Boyles SH, Edwards R, Gregory W, Clark A. Complications associated with transobturator sling procedures. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18(1):19-22; Parnell BA, Johnson EA, Zolnoun DA. Genitofemoral and perineal neuralgia after transobturator midurethral sling. Obstetrics and gynecology. 2012;119(2 Pt 2):428-31.

one of our former fellows, whose expertise I am 100% confident of. Further, because of an unrelated episode of hematuria two years after implantation, she underwent cystoscopy which showed no signs of mesh erosion, yet one year later she was found to have erosion that also caused a urethral stricture. In the course of my practice, I have seen mesh complications from many world renowned experts, including physicians that Ethicon has retained as experts in litigation, and, from discussions with my colleagues, I know of many others. In the majority of cases that I see in my practice and that are reported in the literature, the device was placed in accordance with the manufacturers recommendations for placement.

9. Even the simplest complications are often more complicated than they appear. It is commonly stated that when there is extrusion of the mesh through the vaginal wall, it is quite a simple thing to just trim the edges of the exposed sling and either create small vaginal wall flaps to cover the defect or simply leave the wound open and apply estrogen. However, the studies that report successful outcomes generally have a short follow-up and the outcomes may be much worse than they appear.[13] In my own personal experience, I have seen many patients who were treated this way who came back months, years, and even decades later with more extrusions and granulomas that proved almost impossible to "cure."[14] These persistent and recurrent erosions are also reported in the medical literature and in Ethicon's own documents.[15]

10. Given the increasing number of mesh sling operations performed and the complexity of surgery to repair the complications, there are an increasing number of patients who have failed initial treatments and an increasing number of "mesh cripples". As more slings implantations are being performed and the longevity expectations of patients are increasing, it has become apparent that unanticipated, serious, and sometimes lifestyle- altering complications can occur that are not only unique to patients with slings but are also often refractory to treatment.[16] Other authors of recent peer-reviewed articles agree. Lee states that the use of synthetic material has generated novel complications, including mesh extrusion, pelvic and vaginal pain and mesh contraction, requiring a new classification system for complications relating to prosthesis insertion. He coined the term "Meshology" – an evolving field of sub-specialization dedicated to a growing population of affected women with complications from synthetic materials.[17] Barski also described mesh-related complications as "a current emerging problem, which confronts all urologists and gynecologists in their daily practice."[18]

[13] E.g., Blaivas, 2015
[14] E.g., Reynolds WS, Kit, L., Kaufman, M.R., Karram, M., Bales, G.T., and Dmochowski, R. Obturator Foramen Dissection for Excision of Symptomatic Transobturator Mesh. The Journal of Urology. 2012;187(5):1680-4.; Blaivas, 2013.
[15] E.g., Petri, 2012; Abbott, 2014; Hansen, 2014; Unger, 2014; Rogo-Gupta, 2013; Shah, 2013; Dunn, 2014; Hammett, 2014; ETH.MESH.01706065 at 3.
[16] Blaivas, 2015, 481.
[17] Lee, 2015, 202.
[18] Barski and Deng. 2015, p6.

11. The management of many sling complications is fraught with complexity and results in a high rate of persistent symptoms.[19] This has been evident since the complications from the Mersilene, Marlex, Gore-Tex, and Protogen slings that were performed during the last three decades of the 20th century and more recently the Protegen and Mentor ObTape slings. Further Ethicon knew or should have known about the contemporaneous complications that were occurring with their devices and with the devices of their competitors. From a scientific and ethical perspective, Ethicon should have had a high index of suspicion relating to the product defects based on the previous experiences with other synthetic products. [20]

12. These types of serious complications do not occur or occur very rarely in the alternative surgical treatments for stress urinary incontinence (such as autologous fascia pubovaginal slings or the Burch procedure). In my own published experience, performing thousands of rectus fascial slings, I have never injured the bladder, urethra, ureter or any adjacent organs except for two minor urethral injuries in women who had undergone multiple prior incontinence surgeries, both of which were recognized and treated at the same time without adverse sequelae. Further, as a surgeon "of last resort" I have had the opportunity to care for at least a thousand women with complications of biologic slings, retropubic suspensions and vaginal repairs of incontinence and almost never have I seen complications of the magnitude of synthetic mesh sling complications. In addition, when mesh is not involved, it is almost always possible to obtain a satisfactory result treating the complication; not so with synthetic mesh, such as the Gynecare TVT-O.[21]

13. In my capacity as a member of multiple practice guideline panels on stress incontinence and editor-in-chief of a major peer review journal, I have been intimately aware of the peer review literature as it relates to these operations and it is clear that the serious complications in the mesh sling series are far worse than with repairs using biologic products.[22]

14. A "Current Opinion" review article published in 2015 acknowledges that the presence of mesh lateral to the urethra [transobturator placement] may increase the incidence of vaginal pain and dyspareunia and that the presence of mesh in the obturator

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[19] E.g., Deng DY, Rutman, M., Raz, S., & Rodriguez, L.V. Presentation and management of major complications of midurethral slings: Are complications underreported? Neurourology and Urodynamics. 2007;26(1):46-52.

[20] E.g., ETH.MESH.00660488.

[21] Blaivas 2011; Blandon, R., Gebhart, J., Trabuco, E., & Klingele, C. (2009). Complications from vaginally placed mesh in pelvic reconstructive surgery. *Int Urogynecol J 20*, 523-531. doi: 10.1007/s00192-009-0818-9.

[22] Blaivas 2011; Hernández-Gascón, B., Peña, E., Pascual, G., Rodríguez, M., J.M. Bellón, J.M. & Calvo, B. (2012) 'Long-term anisotropic mechanical response of surgical meshes used to repair abdominal wall defects', Journal of the Mechanical Behavior of Biomedical Materials', 5 (1), p. 257–271; Ostergard, D.R. (2011) 'Degradation, infection and heat effects on polypropylene mesh for pelvic implantation: what was known and when it was known', *Int Urogynecol J*, 22 (7), p. 771–774; Yahi, H., Clave, A., Hammou, J. C., Gounon, P., & Cosson, M. (2007). Histological analysis of peri-prosthetic tissue of mesh explanted for complication after sui or pop surgery. *Int Urogynecol J, 18*(1.S149); Feiner, B., & Maher, C. (2010). Vaginal mesh contraction: definition, clinical presentation, and management. *Obstet Gynecol*, *115*(2 Pt 1), 325-330. doi: 10.1097/AOG.0b013e3181cbca4d.

muscles and close to the adductor tendon may increase the risk of groin pain. The article also cites evidence demonstrating better cure rates and lower rates of neurologic symptoms and vaginal pain with retropubic slings (compared to transobturator slings). One of the authors of this peer-reviewed paper is Charles Nager, who also co-wrote the AUGS/SUFU Position Statement on Mesh Midurethral Slings for Stress Urinary Incontinence. Unlike the Current Opinion article, the position statement does not make any distinctions between different types of slings and makes no mention of *any* complications associated with mesh sling products.[23,24]

15. There is a knowledge gap in the area of treatment outcomes related to management of MUS complications. Published reports on long-term outcomes of patients after mesh removal surgery are limited. Most authors of studies in this area commented on the technical difficulties encountered during mesh excision surgery and the fact that many (and in some series, most) patients require two or more surgeries; thus, even in the short term, outcomes are often suboptimal. Beyond the immediate intra-operative risks lays ahead the concern for secondary urinary incontinence and its management. At least one-third of patients undergoing sling excision surgery develop recurrent SUI.

16. Treatment of persistent pain in patients with a SMUS is particularly challenging and has been entirely empirical and progressive in nature. Chronic disabling pain is one of the most common indications for mesh removal, particularly in patients fitted with TOT slings.[25] Barski also described the difficulty treating pain caused by mesh slings with only 28% reporting a relief of symptoms postoperatively. Particularly difficult and traumatic for the pelvic floor were the excisions of transobturator tapes, according to the Barski review.[26] Lee also described pelvic pain and dyspareunia (up to 24% following MUS) as a "most distressing and potentially irreversible complication to treat."[27] The etiology of chronic pain after MUS surgery is multifactorial. A complex interplay of factors can be causative, including synthetic material type, nerve and muscle injury, infection, con- traction, erosion or extrusion.[28]

17. Mesh complications are significantly under-reported.[29] Additionally, most patients who experience complications do not return to their original surgeons, contributing to a misperception among individual physicians that their outcomes are better than they, in fact, are.[30]

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[23] Kirby AC, et al. Midurethral slings: which should I choose and what is the evidence for use? Curr Opin Obstet Gynecol. 2015; 27:359-365.
[24] AUGS –SUFU Position Statement on Mesh Midurethral Slings for Stress Urinary Incontinence (Jan. 3, 2014).
[25] Blaivas, 2015, 494.
[26] Barski and Deng, 2015, p6.
[27] Lee, 2015, 202.
[28] Lee, 2015, 205.
[29] Deng, 2007; Anger, 2007.
[30] Blandon 2009; Rostaminia, G., Shobeiri, A., Qurioz, L.H., & Nihira, M.A. Referral pattern for vaginal mesh and graft complications to the University of Oklahoma Pelvic and Bladder Health Clinic. *J Okla State Med Assoc. 2012; 105(9)*:356-8 (ISSN: 0030-1876); Ostergard, D. Lessons from the past: directions for the future. *Int Urogynecol J* (2007) 18:591-598. DOI 10.1007/s00192-007-0330-z.

18. Underreporting of SMUS complications is also well-documented in the medical literature and discussed in the Nature article. Discrepancies exist between the SMUS complication rates reported by urologists from individual institutions, those reported in the literature, the (unreported) experience of tertiary care practices and those in the MAUDE (Manufacturer and User Facility Device Experience) database.[31] In our Nature review, we determined that approximately 88,000 removal surgeries should have been performed (based on published rates), and yet only a small fraction of such procedures are reported in the peer-reviewed literature.[32] Use of imperfect research methodologies, a lack of long-term follow up and reporting bias have been suggested as causes of these differences.[33]

19. The overall risk of a negative outcome after SMUS implantation surgery is ≥ 15%.[34] We calculated these minimum risks: revision surgery for erosion and obstruction alone, 5.6%; chronic pain, 4.3%; recurrent or persistent SUI, 5.3%; and *de novo* refractory OAB 3.9%. Of note, in patients requiring mesh removal, recurrence of SUI has been reported in 10–60% of individuals. Transobturator sling complications differed from retropubic sling complications in type and severity.

20. Despite the limitations in determining the exact rate of MSUS complications, other researchers have come up with similar rates in recent literature. Barski and Deng reported that "the rate of mesh-related complications is about 15–25% and mesh erosion is up to 10% for POP and SUI repair. Mesh explantation is necessary in about 1-2% of patients due to complications."[35] Lee reported the incidence of chronic/persistent pain following MUS placement varies from 0 to 30%. The authors cited that Petri and Ashok reported on the management of 280 cases of late sling complications (RP 210 and TO 70). Compared with the retropubic MUS group, the TOT group had greater number of complications related to persistent pain (10% TVTs vs 32% TOT tapes), dyspareunia (3 vs 18%) and tape-related infections (4 vs 18%).[36] These rates are in keeping with those reported in Nature.

21. Ethicon did not warn doctors and patients about the difficulty removing their products, such as the Gynecare TVT-O, and the poor or less than optimal results when excision or revision is needed due to complications. Ethicon did not attempt to train or educate doctors on how to best treat complications when they occurred.[37]

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[31] Blaivas 2015, 481-509, 484.
[32] Blaivas 2015, 481-509, 485.
[33] Blaivas 2015, 481-509, 485.
[34] Evaluating the incidence, severity and consequences of the various RP and/or TOT sling complications is a daunting task. The reasons are varied include factors such as the failure of most of the thousands of articles regarding SMUS to track complications in any meaningful way; short-term follow-up and patients lost to follow-up; new, previously unrecognized complications such as banding as a cause of dyspareunia; absence of severity descriptions of pain; different complication profiles with different slings; and failure to address outcomes (including recurrent SUI) following corrective surgeries.
[35] Barski and Deng 2015, 2.
[36] Lee, 2015, 205.
[37] Blaivas, 2013; Unger, C., Abbot, S., Evans, J., Jallad, K., Mishra, K., Karram, M., Iglesia, C., Rardin, C., Barber, M. Outcomes following treatment for pelvic floor mesh complications. *Int Urogynecol J.* DOI 10.1007/s00192-013-2282-9.

22. Ethicon admits that the TVT-O is associated with post-operative groin pain.[38]

23. SMUS such as the TVT-O are no more effective than autologous fascial slings and Burch colposuspension. In my own personal series and according to several peer review meta-analyses the success rate for autologous slings is comparable to synthetic mesh slings.[39] Further, our recently published Nature article cited objective cure rates of patients with SUI after treatment with either TOT [transobturator] or RP [retropubic] slings at or after a follow-up duration of 5 years ranged between 71% and 92%, and subjective cure rates between 65% and 90.3%. By contrast, in another investigation, 30 researchers using much more stringent outcome criteria found the 2-year objective success rate of RP and TOT slings was 77% and 72.3%, respectively and the subjective success rates were 56% and 48%.[40]

24. A systematic review and meta-analysis by Ford and Ogah, published in July 2015 in the International Urogynecology Journal, also sheds light on the efficacy of SMUS in the treatment of intrinsic sphincter deficiency. In this study, there was a statistically significant difference in subjective cure rates, with the number of women reporting a cure in the transobturator group (75.4%) higher than the retropubic group (85.5%). This gives a 12 % relative risk reduction in achieving cure with the transobturator route. The need to undergo repeat incontinence surgery in the long term (≥5 years) was also higher with the transobturator route. Interestingly, in the eight trials that were analyzed in this review, only one reported outcome data on adverse events.[41] Constantini, in a randomized controlled trial published July, 2015, also demonstrated lower cure rates with a transobturator MSUS. Subjective and objective cure rates were 59.6% and 70.2 % in the transobturator group and 75% and 87.5 % in the TVT group. The mid-to-long-term trend was a decreasing continence rate in patients who underwent TOT, compared with a stable rate for TVT.[42] A review, published by Tommaselli in January, 2015, also found a lower subjective cure rate with transobturator slings, accompanied by an increased risk of pain.[43]

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[38] ETH.MESH.09170211 and accompanying video

[39] Ogah, J., Cody, D. J., & Rogerson, L. (2011). Minimally invasive synthetic suburethral sling operations for stress urinary incontinence in women: a short version Cochrane review. Neurourol Urodyn, 30(3), 284-291. doi: 10.1002/nau.20980; Wadie, B. S., Edwan, A., & Nabeeh, A. M. (2005). Autologous fascial sling polypropylene tape at short-term followup: a prospective randomized study. J Urol, 174(3), 990-993. doi: 10.1097/01.ju.0000169492.96167.fe; Garcia-Urena, M. A., Vega Ruiz, V., Diaz Godoy, A., Baez Perea, J. M., Marin Gomez, L. M., Carnero Hernandez, F. J., & Velasco Garcia, M. A. (2007). Differences in polypropylene shrinkage depending on mesh position in an experimental study. Am J Surg, 193(4), 538-542. doi:10.1016/j.amjsurg.2006.06.045.

[40] Blaivas, 2015.

[41] Ford A, Ogah J. "Retropubic or transobturator mid-urethral slings for intrinsic sphincter deficiency-related stress urinary incontinence in women: a sustematic review and meta-analysis." Int Urogynecol J DOI 10.1007/s00192-015-2797-3.

[42] Constantini E, Kocjancic E, Lazzeri M, Giannantoni A, Zucchi A, Carbone A, Bini V, Palleshi F, Pastore A, Porena M. "Long-term efficacy of the trans-obturator and retropubic mid-urethral slings for stress urinary incontinence: update from a randomized clinical trial." World J Urol DOI 10.1007/s00345-015-1651-z.

[43] Tommaselli, G. A., C. Di Carlo, C. Formisano, A. Fabozzi, and C. Nappi. "Medium-Term and Long-Term Outcomes Following Placement of Midurethral Slings for Stress Urinary Incontinence: A Systematic Review and Metaanalysis." *Int Urogynecol J* 26, no. 9 (Sep 2015): 1253-68.

25. These studies support my opinion that alternative surgical procedures for SUI (i.e. Burch colposuspension and autologous fascial slings) are at least as effective as SMUS. They also support my opinion that SMUS do not offer any significant long-term benefit over other surgeries. In addition, these results are likely overly optimistic owing to a host of factors including the suboptimal outcome instruments used, inclusion of patients who might have required multiple procedures and the loss of a substantial number of patients to follow-up monitoring.

26. Pubovaginal slings using autologous fascia are safer than synthetic slings. Safer, at least with respect to serious complications such as lifestyle altering pain, dyspareunia, vascular, erosion, and bowel and lower urinary tract injury. Although the reported incidence of urinary retention is a bit higher, much of the data to support that comes from an era before the importance of a tension free repair was known. Using current technique, urinary retention is comparable amongst autologous and synthetic slings.[44]

27. Ethicon would have known about these serious complications if proper clinical testing had been performed. Appropriate and unbiased clinical testing would have shown the problems and complications associated with synthetic slings, like the Gynecare TVT-O. Because of the known complications, many occurring years after the original surgery, well-conducted, long-term clinical trials (or a registry) would have demonstrated the extent and nature of these devastating complications.

28. Ethicon knew or should have known of these complications because of known problems associated with predicate devices. From both a scientific and ethical perspective, Ethicon should have had a high index of suspicion relating to the product defects based on previous experience with other synthetic products. Ethicon knew or should have known about the potential for serious complications from other mesh slings, because of the known experience with Mersilene, Marlex and Gore-Tex slings that were performed during the last three decades of the 20th century. Accordingly, Ethicon should have had a high index of suspicion about the possibility that the newer iterations of synthetic slings, such as Gynecare TVT-O, could cause similar or even new complications. Since many of these complications occurred many months or years after the original surgery, Ethicon should have taken appropriate measures to investigate this and also warn physicians and patients about the possibility of these late-onset complications.

29. As a practicing surgeon, educator, academician, and editor/reviewer of scientific journals, I became aware of serious complications associated with synthetic mesh earlier than physicians in community practice. Industry (including Ethicon) representatives were present at meetings in which complications were discussed by me and my colleagues. In addition, case reports appeared in the literature relatively soon after introduction of these devices and before clinical trials were completed. Further, complications appeared in the

[44] Blaivas 2011; Garcia-Urena, M. A., Vega Ruiz, V., Diaz Godoy, A., Baez Perea, J. M., Marin Gomez, L. M., Carnero Hernandez, F. J., & Velasco Garcia, M. A. (2007). Differences in polypropylene shrinkage depending on mesh position in an experimental study. *Am J Surg*, *193*(4), 538-542. doi:10.1016/j.amjsurg.2006.06.045.

MAUDE database. As evidenced by Ethicon's written materials, Ethicon downplayed these complications. There is almost always a time lag between what is known by Industry and physicians such as myself and community physicians. This is due to the time it takes for the dissemination of information and the willful withholding of information by Ethicon. Community doctors are often unable to keep up with the vast amount of and rapid changes in scientific literature. They generally rely on Industry to provide complete and accurate information to them. Based on my interactions with company representatives (including Ethicon), and company (including Ethicon) promotional materials, synthetic slings were invariably described as effective, quick, having few complications, and easy to learn and perform.

30. I have first-hand personal knowledge of mesh company representatives downplaying the complications reported with synthetic mesh in public at post graduate seminars and also when product representatives pitched their products in one-on-one encounters with surgeons. I never heard any representative caution about their occurrence or that the surgeon or patients should be so warned. This despite the fact that in every public appearance, lecture, postgraduate course, etc., I and my academic colleagues always brought up the topic for discussion. I directly spoke to representatives of Ethicon about my concerns.

31. The polypropylene mesh used in the Gynecare TVT-O flakes and cracks *in vivo*. The flaking and cracking includes particle loss and fissuring.[45] The flaking, cracking, particle loss, and fissuring lead to degradation of the polypropylene fibers and release of polypropylene shards into pelvic tissues, further worsening the body's inflammatory and fibrotic reactions to the mesh material, causing pain, dyspareunia, erosions, failure of the device, and other complications.[46]

32. The Prolene mesh in the TVT-O can be either Mechanically Cut (MCM) or Laser Cut (LCM) in the manufacturing process.[47] Each carries its own unique problems for women.

33. MCM can cause problems of fraying and deformation. Numerous complaints of the MCM fraying and deforming during the implantation were reported to Ethicon.[48] Numerous complaints of the Prolene mesh in its TVT product fraying and deforming during the implantation were reported to Ethicon.[49] Between launching the (made of the

[45] E.g., DEPO.ETH.MESH.00004755; ETH.MESH.12831391; Weisberg Dep. (5/31/13) 461:7-462:3; ETH.MESH.01813975; ETH.MESH.01317508.

[46] E.g., Iakovlev, 2014; Junge K, Klinge U, Prescher A, Giboni P, Niewiera M, Schumpelick V. Elasticity of the anterior abdominal wall and impact for reparation of incisional hernias using mesh implants. Hernia: the journal of hernias and abdominal wall surgery. 2001;5(3):113-8; Clave, 2010; C.R. Costello SLB, S.A. Grant, D.S. Cleveland, T.S. Loy and B.J. Ramshaw. Characterization of Heavyweight and Lightweight Polypropylene Prosthetic Mesh Explants From a Single Patient. Surgical Innovation. 2007;14(3):168-76; ETH.MESH.01809082; ETH.MESH.05644163; ETH.MESH.01317508 at 7523.

[47] ETH.MESH.09951087; Deposition of Dan Smith, May 15, 2014, 48:11-17.

[48] E.g., ETH.MESH.03905472; ETH.MESH.02621559; ETH.MESH.01813975; ETH.MESH.05644163; ETH.MESH.01809082.

[49] E.g., ETH.MESH.03905472; ETH.MESH.02621559; ETH.MESH.01813975; ETH.MESH.05644163; ETH.MESH.01809082.

same Prolene material at the TVT-O) and November of 2003, Ethicon received 58 such complaints. According to these complaints, the fraying became more apparent when the color of the Gynecare TVT was changed from clear to blue.[50] Physicians also reported to Ethicon that the "crumbling" of the Gynecare TVT was worsened when the product was stretched or when the protective sheaths were removed during surgery.[51] An Ethicon engineer stated the "root cause" of the particle loss was the mechanical cutting of the polypropylene mesh and that changing the method of cutting could significantly limit the fraying of the mesh.[52] Ethicon documents confirm that the particle loss for the mechanical cut Gynecare TVT rates higher than the synthetic slings of other manufacturers.[53]

34. The polypropylene mesh used in the Gynecare TVT-O deforms *in vivo*. The deformation includes curling, cording, roping, rolling, deformation, loss of pore size with tension, and fraying. This deformation leads to pain and contracture and other complications.[54] Ethicon documents clearly illustrate the Gynecare TVT roping, curling and deforming when subjected to tension or elongation.[55] The roping, curling, deformation, particle loss and degradation was greater with the mechanically cut mesh than with the laser cut mesh.[56]

35. The mechanically cut Gynecare TVT-O also has "sharp edges", which can cause adverse clinical complications in women such as erosion and abrasions and others.[57] Ethicon also received concerns from physicians that these sharp edges were causing complications in patients, including increased erosions.[58]

36. LCM means that the plastic mesh is cut into strips using a laser instead a cutting blade.[59] The result is that the mesh itself is stiffer than mechanically cut mesh. In fact, an internal memo from Becky Leibowitz to Paul Parisi and Dan Smith in late 2004 found that when the laser cut mesh was stretched it became about three times stiffer than the machine-

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[50] E.g., ETH.MESH.00541379; ETH.MESH.00863391; ETH.MESH.02180833; ETH.MESH.02180828.
[51] E.g., ETH.MESH.02180833.
[52] E.g., ETH.MESH.01813975.
[53] E.g., ETH.MESH.01221055; ETH.MESH.00585842; ETH.MESH.01219629; ETH.MESH.01221024; ETH.MESH.00585823.
[54] E.g., Klinge, 1998 (Shrinking); Feiner, 2010; Ostergard DR. Lessons from the past: directions for the future. Do new marketed surgical procedures and grafts produce ethical, personal liability, and legal concerns for physicians? Int Urogynecol J Pelvic Floor Dysfunct. 2007;18(6):591-8; Jacquetin, 2009; Tunn R, Picot A, Marschke J, Gauruder-Burmester A. Sonomorphological evaluation of polypropylene mesh implants after vaginal mesh repair in women with cystocele or rectocele. Ultrasound in obstetrics & gynecology: the official journal of the International Society of Ultrasound in Obstetrics and Gynecology. 2007;29(4):449-52.
[55] E.g., ETH.MESH.00294195; (Moalli, P. A., et al. (2008). "Tensile properties of five commonly used mid-urethral slings relative to the TVT." Int Urogynecol J Pelvic Floor Dysfunct 19(5): 655-663); ETH.MESH.00440005; ETH.MESH.00302390.
[56] E.g., ETH.MESH.08334245; ETH.MESH 00440005; ETH.MESH 00302390.
[57] E.g., ETH.MESH.09656790.
[58] E.g., ETH.MESH.06696589; ETH.MESH.00330760; ETH.MESH.03911107; ETH.MESH.02652710; ETH.MESH.02654865; ETH.MESH.02655451; ETH.MESH.02655902; ETH.MESH.02656482; ETH.MESH.02657205; ETH.MESH.02658063; ETH.MESH.02653814; ETH.MESH.02652985; ETH.MESH.03715978.
[59] Lamont Dep. (9/11/13) 12:13-13:14

cut PROLENE mesh.[60] Just four years later, in meeting notes, it is noted that there is a consensus that laser cut mesh is more rigid and stiff and that no clinical study has been done regarding the differences between laser cut mesh and mechanical cut mesh. The notes further indicate potential benefits of using mechanical cut mesh over laser cut mesh noting a lower rate of erosions, tensioning would be more similar to current products, and the edges of mechanical cut mesh might allow for an easier insertion.[61]

37. Importantly, most surgeons using the TVT-O products did not know what type of mesh (LCM or MCM) they were using.[62] Thus, there is no way for doctors to adjust tensioning differently or be aware that the mesh is stiffer, or to warn patients of an increased risk of erosions. The difference in the stretch profile between mechanically cut and laser cut mesh also led Carl G. Nilsson and Christian Falconer, two of the inventors of the original TVT,[63] and Jean de Leval, the inventor of TVT-O, to refuse to use, and question the use, of laser cut mesh.[64]

38. Moreover, use of the laser cut mesh would make them unable to rely on the original studies and data they use to tout the safety and effectiveness of the original TVT.[65] This data is something Ethicon wanted to rely on for all TVT-R prodcuts.[66] Additionally, laser cut mesh was never assessed on its own in a clinical trial.[67] Finally, the rigidity of the laser cut mesh can cause a higher incidence of erosion and sexual dysfunction than mechanically cut mesh.[68]

39. Polypropylene mesh, like that used in the TVT-O, shrinks unpredictably and asymmetrically, influenced by individual response, bacterial contamination, anatomical location, and time.[69] Ethicon has not conducted any testing to evaluate its synthetic vaginal meshes for mesh shrinkage. My opinions relating to shrinkage and contraction are based on peer-reviewed scientific literature, my experience treating women with obvious symptoms and findings of mesh shrinkage, and my surgical experience removing mesh that is deformed and contracted – consistent with mesh shrinkage.

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[60] ETH.MESH.01809080
[61] ETH.MESH.03916716.
[62] ETH.MESH.09911296; ETH.MESH.09951087.
[63] ETH.MESH.16416002, ETH.MESH.04048515.
[64] ETH.MESH.03916716.
[65] ETH.MESH.06040171; ETH.MESH.01706065.
[66] Trial Testimony of Katrin Elbert, *Perry v. Luu, et al.*, (2/11/15) 3328-30.
[67] ETH.MESH.03941617.
[68] ETH.MESH.00294195; ETH.MESH.03916716; ETH.MESH.01706065; ETH.MESH.03923121
[69] Klinge 1998; FDA Safety Communication 2011. Web; Mamy, L., Letouzey, V., Lavigne, J. P., Garric, X., Gondry, J., Mares, P., & de Tayrac, R. (2011). Correlation between shrinkage and infection of implanted synthetic meshes using an animal model of mesh infection. *Int Urogynecol J, 22*(1), 47-52. doi: 10.1007/s00192-010-1245-7; Letouzey, V., Huberlant, S., Lavigne, J., Mares, P., Garric, X. & De Tayrac, R. (2012). Is polypropylene mesh coated with antibiotics is efficient to prevent mesh infection and contraction in an animal infectious model? [Abstract]. *37th Annual Meeting of the International Urogynecological Association,* 193; Jacquetin, B., & Cosson, M. (2009). Complications of vaginal mesh: our experience. *Int Urogynecol J Pelvic Floor Dysfunct, 20*(8), 893-896. doi: 10.1007/s00192-009-0926-6; Feiner 2010.

40. Because the PROLENE mesh in the TVT-O retracts and shrinks, it is difficult for the surgeon to determine the proper amount of tension to apply.

41. Dr. Iakovlev and I have recently published a peer-reviewed abstract for an international meeting that describes mesh hardening, degradation, deformation, and nerve/muscle entrapment from a histological standpoint and how these findings relate to pain and other mesh complications. We anticipate this research will appear as a full article in a prestigious peer-reviewed journal in the near future.

42. Polypropylene mesh, like that used in the TVT-O, creates scar plate that can entrap nerves.[70] Pore size, density, weight and surface area are all factors involved in scar plate formation.[71] This increased scar plate formation has adverse clinical consequences in women, including distortion of the pelvic anatomy, chronic pain, dyspareunia and/or sexual impairment, bladder and/or bowel dysfunction and other complications. These forces can act on the entire structure of the Gynecare TVT-O.[72]

43. The design of the Gynecare TVT-O is flawed because the product IFU does not accurately represent the nature of the inflammatory response and resulting scar tissue. Instead, the TVT-O IFUs (both pre and post 2015) state that "animal studies show that implantation of PROLENE mesh elicits a minimal inflammatory reaction in tissues, which is transient and is followed by the deposition of a thin layer of tissue, which can grow through the interstices of the mesh, thus incorporating the mesh into adjacent tissue. The material is not absorbed, nor is it subject to degradation or weakening by the action of tissue enzymes." Ethicon did not alert physicians that: (1) the mesh creates dense scar tissue not a "thin layer of tissue;" (2) that the mesh is subject to degradation and weakening upon implantation; or that (3) the complications are not transient.[73] Equally troubling is the fact that Ethicon did delete the term “transient” from its IFUs for the TVT, TVT Exact, and TVT Abbrevo, but not the TVT-O. There is no explanation on why this term would not be removed from the TVT-O IFU as well, particularly as all the TVT products are made with the same polypropylene.

44. The design of the TVT-O is also flawed because the product’s IFU does not accurately and completely represent the nature of the potential complications that women can suffer. It simply lists an almost encyclopedic number of adverse events with a kind of equanimity that minimizes the impact on patients and conveys to the doctor the impression that although these things might occur, they are very rare. For example, it states that one

[70] E.g., Heise, 1998; Demirer, 2006; Klosterhalfen, 2005; Vervest, H., Bongers, M. & van der Wurff, A. Nerve injury: an exceptional cause of pain after TVT. Int. Urogynecol. J. Pelvic Floor Dysfunct. 6, 665–667 (2006); Iakovlev V., M. G., Blaivas J. (2014). "Pathological Findings of Transvaginal Polypropylene Slings Explanted for Late Complications: Mesh is Not Inert [Abstract]." International Continence Society Meeting Annual Meeting; ETH.MESH.01264260

[71] E.g., Iakovlev, 2014; ETH.MESH.01264260

[72] E.g., Blaivas, J. G., et al. (2015). "Safety considerations for synthetic sling surgery." Nat Rev Urol

[73] E.g., ETH.MESH.05588123; Barbolt Dep. 01/08/14, 409; 516-17; Hinoul Dep. 4/5/12 99:09-25; 4/6/12 518:14520:20; 6/26/13 175:1-176:17,;184:18-22; 328:10-24; Owens Dep. 9/12/2012 98:11-99:07; ETH.MESH.00870466; ETH.MESH.01218361; Holste Dep. 7/29/13 51:3-53:6; Vailhe Dep. 6/21/13 383:8-19.

or more revision surgeries may be necessary but does not mentioned the well-known fact that these operations can be very difficult to do, requires great expertise and the results are often sub optimal. Further, the IFU does not even mention the severity and life style altering nature of some of these complications.

45. In addition, the IFU incorrectly states that the TVT-O is "tension-free." In reality, it is extremely difficult to correctly "tension" the sling. If placed even slightly too snugly, the tape may cause temporary or permanent lower urinary tract obstruction. This is compounded and the problems increase over time as the TVT-O shrinks in a woman's body. On the other hand, if the sling is applied too loosely, incontinence will persist.

46. The IFU is also inadequate in that it represents complications as "transitory":

> Transitory local irritation at the wound site and a transitory foreign body response may occur. This response could result in extrusion, erosion, fistula formation or inflammation.[74]

This language is not correct – the complications can be permanent, not transitory as Ethicon states. I agree with Ethicon's Associate Medical Director of Worldwide Customer Quality Meng Chen, M.D., who stated "Pardon me again, from what I see each day, these patient experiences are not "transitory" at all."[75] Although language was added in January 2015 that reads "Neuromuscular problems, including acute and/or chronic pain in the groin, thigh, leg, pelvic and/or abdominal area may occur," this language was insufficient to address the issues I have raised. I also believe that the language was added too many years after Ethicon was aware of the chronic nature of the problems women can experience and still does not adequately warn physicians and patients about the complications associated with the TVT-O device.

47. Despite moving to a lighter weight, larger pore sized mesh for its hernia products in the late 90's and for its pelvic organ prolapse products so as to minimize the body's inflammatory and foreign body reaction to the polypropylene devices, Ethicon continued to manufacture the Gynecare TVT from the heavier weight, smaller pore sized mesh, ignoring the increased risks to patient safety and product efficacy.[76]

48. There is little margin of error when placing a transobturator sling, such as the Gynecare TVT-O. The transobturator procedure involves the blind passage of trocars through the vagina and passing through or in close proximity to the following structures: pubocervical connective fascia, obturator internus muscle, obturator membrane, obturator externus muscle, adductor brevis muscle, adductor magnus muscle, gracilis muscle, levator muscles and then out two small incisions in the labia majora. In my experience training

[74] ETH.MESH.02340829; ETH.MESH.02340756; ETH.MESH.02340974; ETH.MESH.00860239; ETH.MESH.02340902. *Also* Weisberg dep. (8/9/13) 968:2-969:10; Robinson Dep. (9/11/13) 329:12-330:7
[75] ETH.MESH.04093125.
[76] E.g., ETH.MESH.07455220; ETH.MESH.09275875; ETH.MESH.07455218; ETH.MESH.02268619; ETH.MESH.02589032; ETH.MESH.01264260; Smith Dep. (2/3/2014) 723:9-724:6, 829:16-829:19; Burkley Dep. (5/22/13) 184:17-24

fellows and residents, I was struck by what a difficult time they had finding the correct plane, how much bleeding they got into during the dissection and how often they injured or almost injured the bladder or urethra during the dissection and/or passing the trocar. Even in the best hands, bladder and urethral perforations have occurred during implantation of TOT slings.

49. The location of anatomical structures varies from individual to individual and even in the same individual, making safe and accurate passage of trocars and positioning of the mesh unpredictable. There is no such thing as "normal anatomy." For example, positioning of the patient in various degrees of dorsal lithotomy position can change the locations of nerves and blood vessels. Further, the size of the obturator foramen and the bony pelvis varies, making it impossible to know the relationship between the tip of the trocar and vital structures.[77]

50. Claims that make the procedure sound as if it is safer and easier to perform than it actually is are misleading. The fact is, it is not so easy to learn these techniques and the ergonomics of the trocars are such that it is easy to misguide them and end up in the wrong place. In addition, there is ample evidence in the literature that it is very common for the trocars to inadvertently puncture the bladder or urethra during trocar passage.[78]

51. Due to tissue ingrowth, it is very difficult and often impossible to remove all of the mesh and in most instances there are remnants of mesh that remain. This is particularly difficult after a transobturator approach because the mesh is lateral to the bony pelvis and embedded in muscles containing and adjacent to nerves.[79] The space that is distal to the obturator foramen is not easily accessed and foreign to most urologists and gynecologists. The mesh that remains behind can form the nidus for infections, more erosion, more scarring, more inflammation, and pain.

52. I have reviewed the Material Safety Data Sheet (MSDS) for the polypropylene used in the Gynecare TVT-O medical device. This document, under INCOMPATIBILITY, states that the following materials are incompatible with this product: Strong oxidizers such as chlorine, peroxides, chromates, nitric acid, perchlorates, concentrated oxygen, sodium hypochlorite, calcium hypochlorite and permanganates. Chlorine; Nitric acid. And yet, many of these chemicals are routinely found in human tissue. The document also states under COMPONENT TOXICITY: Polypropylene has been tested in laboratory rats by subcutaneous implantation of discs or powder. Local sarcomas were induced at the site of implantation. No epidemiological studies or case reports suggest any serious chronic health hazards from long-term exposure to polypropylene decomposition products below the

[77] Whiteside JL, Walters MD. Anatomy of the obturator region: relations to a trans-obturator sling. Urogynecol J Pelvic Floor Dysfunct. 2004 Jul-Aug;15(4):223-6; LitWiller, J., Wells, R., Halliwill, J., Carmichael, S., & Warner, M. Effect of Lithotomy Positions on Strain of the Obturator and Lateral Femoral Cutaneous Nerves. Clinical Anatomy 17:45-49 (2004). DOI 10.1002/ca.10168.

[78] Bhoyrul S, Vierra MA, Nezhat CR, Krummel TM, Way LW**.** Trocar injuries in laparoscopic surgery. Journal of the American College of Surgeons. 2001;192(6):677-83; Shindel AW, Klutke CG**.** Urethral slings placed by the transobturator approach: evolution in the technique and review of the literature. Current Urology Reports. 2005;6(5):385-92; ETH.MESH.03934952

[79] Reynolds 2011

irritation level.[80] Ethicon IFUs do not include the toxic and carcinogenic warnings contained in the MSDSs. Ethicon marketing materials for doctors and patients do not include the toxic and carcinogenic warnings contained in the MSDSs.[81]

53. The medical literature surrounding SMUS, including Gynecare TVT-O, is seriously flawed for reasons including, but not limited to, industry sponsorship, researcher bias, publication bias, industry manipulation of data, inappropriate choice of outcome variables, and lack of long-term follow-up.[82] For example, internal Ethicon documents included a contract between Ethicon and Medscand Medical A.B. in which it was to receive payment contingent upon certain predetermined study outcomes. Payments to Medscand were conditioned upon the completion of studies by a predetermined date.[83] With the TVT-O product at issue in this report, de Leval received royalties from the sale of the device and yet claimed in the publication that he "had no funding or other agreement has limited their ability to fairly complete and publish this research study, and that they have had full control of the primary data and their interpretation." This is a clear conflict of interest and renders both studies biased and unreliable.[84]

54. In the Nature review, we noted the poor quality of many of the studies assessing risks of SMUS-associated complications.[85] Deficiencies include the absence of sufficiently explicit outcome data due to the validation instruments used, the lack of long-term data, the loss of patients to follow-up, and the failure to distinguish between different products - to name a few. The poor quality of many of the studies on SMUS has been confirmed by other authors as well. Brubaker reported on missing data in two large SUI trials, TOMUS and SISTer.[86] Barski, in performing the meta-analysis on mesh complications, found no randomized trials on the surgical treatment of mesh complications.[87]

55. Regarding the "gold standard", a recent editorial in the International Urogynecology Journal, titled "The failed idea of a 'gold standard'", reminded physicians

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[80] World Health Organization International Agency for Research on Cancer; IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 74: Surgical Implants and Other Foreign Bodies, Summary of Data Reported and Evaluation; Geneva: WHO, 24 November 1999.; Yahi 2007

[81] Sunoco 2004 MSDS; Sunoco 2006 MSDS; ETH.MESH.02026591; ETH.MESH.02340902; ETH.MESH.02340756; ETH.MESH.02340974; ETH.MESH.05815791; ETH.MESH.08003197

[82] ETH.MESH.00658508; ETH.MESH.03918253; Atassi, Z., Reich, A., Rudge, A., Kreienberg, R., Flock, F. Haemorrhage and nerve damage as complications of TVT-O procedure: case report and literature review. Arch Gynecol Obstet (2008) 277:161–164. DOI 10.1007/s00404-007-0424-3; Marqués Queimadelos A, Sousa Escandón A, Garciá Fandini M, Cimadevila Garciá, Lema Grille J (2004) Cabestrillo suburetral transobturatriz en el tratamiento de la incontinencia urinary de esfuerzo femenina. Rev Med Univ Navarra 48:62–69

[83] ETH.MESH.08696084

[84] ETH.MESH.03918801; ETH.MESH.03918253; Atassi 2008; Marques 2004.

[85] Blaivas, 2015.

[86] Brubaker L, et al. Missing data frequency and correlates in two randomized surgical trials for urinary incontinence in women. Int Urogynecol J. 2015; 26:1155-1159.

[87] Barski D and Deng DY. Management of mesh complications after SUI and POP repair: Review and analysis of the current literature. Biomed Res Int. 2015;2015:831285, p2. Doi: 10.1155/2015/831285. [Epub 2015 Apr 20].

that the evidence behind 'gold standards' is often incomplete and of insufficient quality, that many 'gold standards' were consensus, not evidence-based, and that so-called "gold standards" have a tendency to become outdated quickly, never to recover. An article by a pioneer of the TVT, Nilsson (published January, 2015), advised physicians that "it is a waste of both public and private resources to launch poorly documented new treatment concepts and it is especially wrong for the women suffering from stress urinary incontinence to become the subjects of experimental efforts without ethical approval and written informed consent." The article states that "any variation of a procedure needs its own thorough clinical testing before it can be accepted for common use."

56. According to a recent article by Lee, patients with MUS placed for SUI should continue to undergo long-term follow-up to monitor for delayed symptoms or complications since the long-term consequences of MUS are still unknown.[88]

57. Ethicon's patient brochures for the TVT-O are woefully inadequate and do not fairly communicate the risks associated with the TVT-O.

58. I reviewed the current prescriptive information for the TVT-O. The Warnings in the Instructions for Use (IFU) do not address the serious and lifestyle-altering complications described in this report. This information is critical for doctors and patients who are making choices about the best treatment options for SUI, a quality of life condition. The information this is provided is often incomplete, misleading, and inaccurate. Some examples (my comments in italics) are:

- "Transitory local irritation at the wound site and a transitory foreign body response may occur. This response could result in extrusion, erosion, fistula formation or inflammation" *Chronic inflammation, fibrosis, and foreign body response always occur. It is extremely difficult to remove the entire mesh. This also does not address the complex surgery often required to correct erosion into the bladder or urethra or the chronic and recurrent nature of many sling erosions.*

- "Over correction, i.e. too much tension applied to the tape, may cause temporary or permanent lower urinary tract obstruction." *This fails to address shrinkage or retraction of the devices resulting in late onset voiding dysfunction.*

- "Transient leg pain lasting 24-48 hours may occur and can usually be managed with mild analgesics." *This fails to address the chronic pain that can occur and additional treatment modalities that may be necessary and may not resolve the pain*

- "Acceptable surgical practice should be followed for the Gynecare TVT Obturator procedure as well as for the management of contaminated or infected wounds." *The vagina is always contaminated and cannot be sterilized.*

[88] Lee D, Bacsu C, Simmern PE, "Mesholgy: a fast growing field involving mesh and or tape removal procedures and their outcomes." (2014) Informa doi: UK10.1586/17434440.2015.985655

- "The Gynecare TVT Obturator procedure should be performed with care to avoid large vessels, nerves, bladder and bowel. Attention to patient anatomy and correct passage of the device will minimize risks." *However, the procedure is performed blindly and these structures, particularly the bladder and nerves, often cannot be avoided, even in the hands of the most experienced surgeons.*

59. Endorsement of these products by professional societies (e.g. the AUGS and SUFU Guidelines Position Statement on Mesh Midurethral Slings for Stress Urinary Incontinence) is biased because of industry involvement in the preparation of these "guidelines" and the financial interests of the authors in the companies' manufacturing the products.[89]

60. Ethicon's own internal document support my opinion that polypropylene mesh degrades in the body.[90]

All opinions are given to a reasonable degree of medical certainty. I reserve the right to amend or supplement this report if additional information becomes available. I also reserve the right to adopt all of my opinions in the other reports that I have submitted for the Wave 1 cases.

This 1st day of February, 2016.

Jerry G. Blaivas, MD

III. FACTS OR DATA CONSIDERED IN FORMING OPINIONS

In addition to the references included herein, an Index is attached hereto and by reference made a part hereof. Please see **Exhibit "C"** attached.

IV. COMPENSATION

[89] ETH.MESH.04982735; ETH.MESH.05125268; ETH.MESH.05342590; ETH.MESH.09143435; ETH.MESH.04982748; ETH.MESH.08073794; ETH.MESH.08073801; ETH.MESH.08307690; ETH.MESH.09293114.

[90] ETH.MESH.07690752; DEPO.ETH.MESH.00004755; ETH.MESH.12831391; ETH.MESH.02589032; ETH.MESH.07192929; ETH.MESH.01264260; Burkley Dep., May 23, 2013 at 315:8-13.

Dr. Blaivas' Fee Schedule is attached hereto and by reference made a part hereof. Please see **Exhibit "B"** attached.

V. LISTING OF CASES IN WHICH TESTIMONY HAS BEEN GIVEN IN THE LAST FOUR YEARS

Merjem Delija v. Neil Sayegh, etc.; index no. 14449/2003

Jose Cuevas v. the Mount Sinai medical Center; Index no. 0017209/2004

Randy Smith, et al. v. Andrew Chan, M.D., et al.; Index No. 024786/2009

Katelyn Vercher, et al. v. Chiari Institute, et al.; 2:09-cv-01751-AKT

Lisa Marie Fontes, et al. v. American Medical Systems, Inc.; 2:12-CV-02472

Debbie Jilovec, et al., v. American Medical Systems, Inc.; 2:12-CV-05561

Joann Serrano, v. American Medical Systems, Inc.; 2:12-CV-3719

Mary Weiler, et al. v. American Medical Systems, Inc.; 2:12-CV-05836

Carolyn F. Smothers v. Boston Scientific Corp.; 2:12-cv-08016

Katherine L. Hall v. Boston Scientific Corp.; 2:12-cv-08186

Julia Wilson v. Boston Scientific Corp.; 2012-02626

Ronda Orozco, et al., v. Boston Scientific Corp.; 2012-03068

Maria Cardenas v. Boston Scientific Corp.; 2012-02912

Diane Albright v. Boston Scientific Corp.; 2012-00909

Jo Huskey, et. al v. Ethicon, Inc.; 2:12-cv-05201

Tonya Edwards, et. al v. Ethicon, Inc.; 2:12-cv-099